## REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested. Claims 1 – 26 and 28-51 are pending in the application, claims 9 and 27 are canceled, claims 1, 16, 28, 32, 46, and 51 are amended.

## ALLOWED CLAIMS

The Examiner is thanked for allowing claims 25 and 26.

## CLAIM REJECTIONS – 35 USC § 102 & 35 USC 103

The Examiner rejects 32 under 35 U.S.C. 102(e) as being anticipated by Simons at al. U.S. Patent No. 6,320,595.

The Examiner rejects claims 1-8, 10-11, 13-15, 28-29, 31, 46 and 51 under U.S.C. 103(a) as being unpatentable over Simons at al. U.S. Patent No. 6,320,595, in view of Deering U.S. Patent No. 6,525,722. The Examiner rejects claim 9 under U.S.C. 103(a) as being unpatentable over Deering in view of Simons and Krisnamurthy (U.S. Patent No. 6,256,038). The Examiner rejects claim 12 under U.S.C. 103(a) as being unpatentable over Deering in view of Simons and Go (US Patent No. 6,101,277). The Examiner further rejects claims 16-23, 30, and 43-45 under U.S.C. 103(a) as being unpatentable over Deering in view of Simons and Kono (US Patent No. 4,772,947).

The present invention teaches, as described in the field of invention section, a novel and inventive apparatus and method for compression/decompression of arbitrary graphical information, for example, for transmission over a computer network. The present invention teaches compression/decompression of the arbitrary data using three dimensional functional forms, or small computer programs aimed at synthesizing geometry. The three dimensional compression is based on mathematical functions and/or small computer procedures as alternative concise representations that describe *volume*.

Simons at. U.S. Patent No. 6,320,595 relates, as described in the field of invention section, to the formation, manipulation and coding of graphical images and particularly, but not exclusively to the coding of graphic objects for transmission to and/or from hand held or mobile devices. Simons attempts to provide a solution which is limited to representing graphical objects in *two dimensional* forms.

The three dimensional forms taught by the present invention are not merely obvious extensions to Simon's two dimensional forms because for describing such three dimensional forms you need mathematical functions that describe volume. Furthermore, use of mathematical functions that describe volume is not obvious to do on a limited resource device such as a mobile telephone

Deering U.S. Patent No. 6,525,722, as described in the field of invention section relates to compressing and decompressing three dimensional data, corresponding to regularly and irregularly tiled (polygonal) *surface* portions of graphical objects. This compression method is direct, converting polygons into condensed form of polygons and hence limited to 3D polygonal representation only, and no procedural (small computer program) based compression is even mentioned.

Kono US Patent No. 4,772,947, as described in its field of invention section, relates to a method and an apparatus whereby video data is compressed prior to being transmitted

The Examiner argued that though neither Kono nor Deering teaches a surface fitting function being selected from any group comprising Bazier freedom functions, B-spline free functions, NURBS, and polynomial functions, Krishnamurthy (US Patent No. 6,256,038) does disclose such a surface fitting function, as taught by the present embodiments.

Krishnamurthy (US Patent No. 6,256,038), as described in the abstract relates to a method for creating smooth parameterization and fitting it to an input surface. However, Kirshnamurthy neither relates to compression of three dimensional (3D) graphical data, nor to coding of graphic objects for transmission. Moreover, Kirshnamurthy again deals with one type of 3D representation – surfaces – and is incapable of capturing the plurality

of representations that a functional/procedural form that is synthesizing geometry has to offer. Applicant maintains that a person skilled in the art, faced with the problem of compression/decompression of *arbitrary* graphical information (for example, for transmission over a computer network) would not arrive at the idea of combining either Simons or Deering, with Kirshnamurthy, for solving the compression/decompression problem as a small functional and/or procedural representation of geometry.

Favorable reconsideration of this rejection in view of the above amendments and the following explanations is respectfully requested.


**Claim 1** defines a graphical data-compressor for compression of received, *arbitrary graphical data* for subsequent transmission, the graphical data-compressor comprising: an input for reception of the received arbitrary graphical data, *an analyzer* linked to the input and *operable for analysis of the received arbitrary graphical data into constituent geometrical parts*, where at least some of the constituent geometric parts comprise predetermined shapes and forms, a *three dimensional* scene describer, linked to the analyzer for description of the at least some of the constituent geometrical parts as a procedural description of the received arbitrary graphical data, where the procedural description comprises a high level *three dimensional* functional form representing one of the constituent geometrical parts, and a transmitter linked to the procedural scene describer for transmission of the procedural description.

The present application teaches the novel and inventive idea, as defined in this claim, of a graphical data-compressor for compression of received arbitrary graphical data, utilizing an analyzer analyzing the arbitrary graphical data into constituent geometrical parts which are described using a high level *three dimensional* functional/procedural form that is capable of synthesizing geometry.

That is to say, with the present invention, *arbitrary* graphical data - data which is not limited to a predefined set of graphical parts, is analyzed into constituent geometrical parts. The constituent geometrical parts comprise predetermined shapes and forms, described using high level three dimensional functional forms.

The present invention teaches compression/decompression of the arbitrary data using *three dimensional* functional/procedural forms. The three dimensional forms are based on mathematical functions and/or computer procedures that describe volume.

Simon U.S. Patent No. 6,320,595 discloses a technique for generating and coding images, for transmission to hand held or mobile devices. With Simon, the images are composed from a limited set of predetermined components, as described in the summary of invention section: "In accordance with a first aspect of the present invention there is provided a method for generating and coding for transmission a graphic image, comprising the steps of: *composing the image from a plurality of component objects from a predetermined set of object types,* the composition including scaling and locating of each object within a fixed coordinate set image field, generating an ordered rendering list identifying the order in which the component objects are to be rendered on regeneration of the image, sequentially coding each object of the list as a first data word identifying the object type and one or more further words specifying coordinates for said object".

Thus Simon fails to teach or even hint at a method or apparatus, as taught by the present invention, wherein *arbitrary* graphical data, which is not limited to any predetermined set of components is compressed as taught by the present invention, utilizing a *three dimensional* functional form, as taught by the present invention, and defined by claim 1.

Deering, as noted by the Examiner on page 5 of the Office Action, does not disclose an analyzer for the analysis of *arbitrary* graphical data into constituent parts, where at least some of the parts comprise predetermined shapes and forms, utilizing a *three dimensional* functional form, as taught by the present invention, and defined by claim 1.

Thus Deering also falls short of teaching or even hinting at such a graphical data compressor, as taught by the present invention.

It is thus respectfully believed that claim 1 is both novel and inventive over the prior art and should be allowed.

**Claim 16** defines a graphics de-compressor, comprising: a receiver for reception of *arbitrary* graphical data, *analyzed into constituent geometrical parts,* where at least some

of the constituent geometric parts comprise predetermined shapes and forms, and are described in *a three dimensional* functional form, a three dimensional geometry evaluator, following the receiver, for evaluation of the graphical data in respect of a predetermined set of shapes and forms stored at the de-compressor, and a piecewise linear surface approximator following the geometry evaluator, for reconstruction of the evaluated data on a piecewise basis, into geometrical entities.

As described above, neither Simons nor Deering teaches, or event hints at the idea of utilizing a *three dimensional* functional form, as taught by the present invention, and defined by claim 16.

It is thus respectfully believed that claim 16 is both novel and inventive over the prior art and should be allowed.

**Claim 28** defines a system for analysis, compression, transmission and decompression of *arbitrary* graphical data, the system comprising: a graphical data-compressor for compression of received, arbitrary graphical data, the graphical data-compressor comprising: an input for reception of arbitrary graphical data, an analyzer, linked to the input, for analysis of the received arbitrary graphical data into constituent geometrical parts, where at least some of the constituent geometric parts comprise predetermined shapes and forms, a *three dimensional* describer, linked to the analyzer, for description of the constituent geometrical parts as a procedural description, where the procedural description comprises a high level *three dimensional* functional form; and a transmitter, linked to the analyzer, for transmission of the procedural description over a data link; the system further comprising a graphical data decompressor for decompression of the procedural description into geometric entities, the decompressor comprising: a receiver for reception of the procedural description from the data link, and a geometry evaluator for evaluating the procedural description in terms of high-level functional forms, thereby to decompress the compressed graphical data descriptions.

As described hereinabove, and defined by claim 28, the present invention teaches the novel and inventive idea of a system for analysis, compression, transmission and decompression of *arbitrary* graphical data in *a three dimensional* functional form.

Neither Deering nor Simons discloses or even hints at such a system for analysis, compression, transmission and decompression of *arbitrary* having an analytic form fitter comprising functionality for fitting the constituent geometrical parts of arbitrary graphical data with functions *representing* the constituent geometrical parts *in three diemnsoianl functioanl form.*

It is thus respectfully believed that claim 28 is both novel and inventive over the prior art and should be allowed.

**Claim 32** defines a method for compressing arbitrary graphical data, comprising: analyzing the arbitrary graphical data into constituent geometrical parts, where at least some of the constituent geometric parts comprise predetermined shapes and forms, describing the constituent geometrical parts as procedural description of the constituent geometrical parts of the arbitrary graphical data, where the procedural description comprises a high level *three dimensional* functional form representing at least one of the constituent geometrical parts, and transmitting the procedural description.

As described hereinabove, and defined by claim 32, the present invention teaches the novel and inventive idea of a method for compression of *arbitrary* graphical data, using a high level *three dimensional* functional, and transmitting the procedural description.

Neither Deering nor Simons discloses or even hints at such a method for, compression of *arbitrary* graphical data, using *a three dimensional*, as taught by the present invention and defined using claim 32.

It is thus respectfully believed that claim 32 is both novel and inventive over the prior art and should be allowed.

**Claim 43** defines a method for decompressing a procedural description of graphical data, the procedural description being in terms of high-level functional forms and associated parameters, the method comprising: evaluating the procedural description in terms of the plurality of high-level functional forms, the functional forms being *selected from a group comprising: Bezier freeform functions, B-spline freeform functions, NURBS, piecewise*

*polynomial equations and rational equations,*and generating geometric entities using the evaluation where at least some of the geometric entities comprise predetermined shapes and forms.

The present invention as defined in claim 43, teaches the new and inventive idea of a method for decompressing a procedural description of graphical data, the procedural description comprising evaluating the procedural description in terms of the plurality of high-level functional forms, the functional forms being *selected from a group comprising: Bezier freeform functions, B-spline freeform functions, NURBS, piecewise polynomial equations and rational equations.*

Neither Simon nor other prior art, cited by the Examiner teaches or even hints at the idea of such a method as taught by the present invention.

Furthermore, the Examiner has allowed claims 25 and 26 which, similarly to claim 43, define fitting the constituent geometrical parts of arbitrary graphical data with functions *selected from a group comprising Bezier freeform functions, B-spline freeform functions, NURBS, piecewise polynomial equations and rational equations.*

It is thus respectfully believed that claim 43 as previously presented is both novel and inventive over the prior art and should be allowed.

**Claim 46** defines a graphical data-compressor for compression of received, *arbitrary* graphical data for subsequent transmission, the graphical data-compressor comprising: an input for reception of the received *arbitrary* graphical data, an analyzer linked to the input and operable for analysis of the received arbitrary graphical data into constituent geometrical parts, where at least some of the constituent geometric parts comprise predetermined shapes and forms, a *three dimensional* scene describer, linked to the analyzer for description of the at least some of the constituent geometrical parts as a procedural description of the received arbitrary graphical data, where the procedural description comprises a high level *three dimensianal* functional form representing at least one of the constituent geometrical parts, and a geometrical part compressor operatively associated with the scene describer and the analyzer, for reduction of constituent geometric parts not described by the describer, into a reduced quantity of data.

As defined by claim 46, the present invention teaches the novel and inventive idea of a graphical data-compressor for compression of received *arbitrary* graphical data for subsequent transmission, using a high *level three* dimensional functional form.

Neither Deering nor Simons discloses or even hints at method using a high level *three dimensional* functional form representing the graphical, as taught by the present invention, and defined by claim 46.

It is thus respectfully believed that claim 46 as previously presented is both novel and inventive over the prior art and should be allowed.

**Claim 51** defines a graphical data-compressor for compression of received, arbitrary three dimensional (3D) graphical data for subsequent transmission, the graphical data-compressor comprising: an input for reception of the received arbitrary 3D graphical data, an analyzer linked to the input and operable for analysis of the received arbitrary 3D graphical data into constituent geometrical parts, where at least some of the constituent geometric parts comprise predetermined shapes and forms, a *three dimensional* scene describer, linked to the analyzer for description of the at least some of the constituent geometrical parts as a procedural description of the received arbitrary 3D graphical data, where the procedural description comprises a high level *three dimensional* functional form representing one of the constituent geometrical parts, and a transmitter linked to the procedural scene describer for transmission of the procedural description.

Neither Deering nor Simons discloses or even hints at a graphical data-compressor using a high level *three dimensional* functional form, as taught by the present invention, and defined by claim 51.

It is thus respectfully believed that claim 51 as previously presented is both novel and inventive over the prior art and should be allowed.

The remaining claims mentioned in this Office Action are believed to be allowable as being dependent on an allowable main claim.

All of the matters raised by the Examiner have been dealt with and are believed to have been overcome.

In view of the foregoing, it is respectfully submitted that all the claims now pending in the application are allowable.

An early Notice of Allowance is therefore respectfully requested.

Respectfully submitted,

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Date: July 28, 2006

**_Encl.:_**
Petition for Extension of Time (1 Month)